

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-40

Name: Beaver Lake

County: Yankton

Legal Description: T95N-R56W-Sec.27, 34

Location from nearest town: 2½ miles east and 2 miles north of Utica, SD

Dates of present survey: August 15-16, 2007

Dates of last survey: August 16-17, 2005

Primary Game Species	Other Species
Northern Pike	Black Bullhead
Black Crappie	Green Sunfish
Bluegill	Orange-spotted Sunfish
Walleye	Common Carp
	Largemouth Bass

PHYSICAL DATA

Surface Area: 72 acres

Watershed area: 76,360 acres

Maximum depth: 10 feet

Mean depth: 5 feet

Lake elevation at time of survey (from field observations): 12 inches low

Date the latest contour map was prepared: GFP shoreline map (2005).

Introduction

Beaver Lake (also known as State Lake) was formed by the construction of a dam across Beaver Creek in 1926. The lake was constructed by the South Dakota Department of Game, Fish and Parks (GFP) and named for the abundance of beaver that once inhabited the area. The Beaver Creek watershed supplies the water for the lake and overflows run via the creek to the James River.

Ownership of Lake and Adjacent Lakeshore Properties

Existing records indicate the entire lake basin and shoreline is owned by GFP. GFP has recently taken a more active role in managing the fishery.

Fishing Access

There is a gravel boat ramp and parking area on the southwest corner of the lake. Shore fishing opportunities are limited. There are several private residences on the east side of the lake.

Field Observations of Water Quality and Aquatic Vegetation

The water in Beaver Lake was very turbid during this year's survey. The Secchi depth measurement was only 23 cm (9 in). Thick stands of common cattail (*Typha spp.*) and river bulrush (*Scirpus fluviatilis*) were found around the entire lake.

BIOLOGICAL DATA

Methods:

Beaver Lake was sampled on August 15-16, 2007 with 5 overnight trap-net sets. The trap nets are constructed with 19-mm-bar-mesh ($\frac{3}{4}$ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads.

Results and Discussion:

Trap Net Catch

Black bullheads (72.2%) and common carp (13.0%) were the most abundant species sampled in the trap nets (Table 1). Black crappie, bluegill, green sunfish, northern pike, and largemouth bass were also sampled.

Table 1. Total catch from five overnight trap net sets at Beaver Lake, Yankton County, August 15-16, 2007.

Species	Number	%	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	390	72.2	78.0	<u>+30.5</u>	251.0	1	0	82
Common Carp	70	13.0	14.0	<u>+4.3</u>	2.8	0	0	87
Black Crappie	37	6.9	7.4	<u>+5.5</u>	4.4	41	19	119
Bluegill	24	4.4	4.8	<u>+3.4</u>	3.0	8	0	125
Green Sunfish	9	1.7	1.8	<u>+1.4</u>	20.0	--	--	--
Northern Pike	5	0.9	1.0	<u>+0.6</u>	0.4	--	--	--
Largemouth Bass	5	0.9	1.0	<u>+0.7</u>	0.2	--	--	--

*One year (2005)

Black Crappie

Management objective: To establish and maintain a black crappie population with a trap net CPUE of 25 or better.

Black crappie adults were introduced in 2005 because we felt the large areas of cattail and bulrushes present in the lake were ideal for establishing a fishery. The crappies sampled this year ranged in length from 160 mm (6.3 in.) to 302 mm (11.9 in) (Figure 1). Although the management objective has not been reached, at least two year classes of fish are present and abundance has increased since 2005.

MANAGEMENT RECOMMENDATIONS

1. Continue the attempts to create a fishery by stocking adult northern pike and black crappies when available.
2. Reduce black bullhead density by intensive netting efforts, either by GFP fisheries staff or commercial fishermen.
3. Conduct lake surveys every other year to monitor the development of the fishery.
4. A feasibility study conducted in 1991 identified dewatering as the most cost effective method for renovating the entire lake. In addition, repairs to the spillway are needed. Consider the possibility of combining the spillway repair with dewatering and a complete renovation.

Table 4. Stocking record for Beaver Lake, Yankton County, 2004-2007.

Year	Number	Species	Size
2004	462	Northern Pike	Adult
2005	808	Black Crappie	Adult
	378	Northern Pike	Adult
2007	101,000	Walleye	Fry

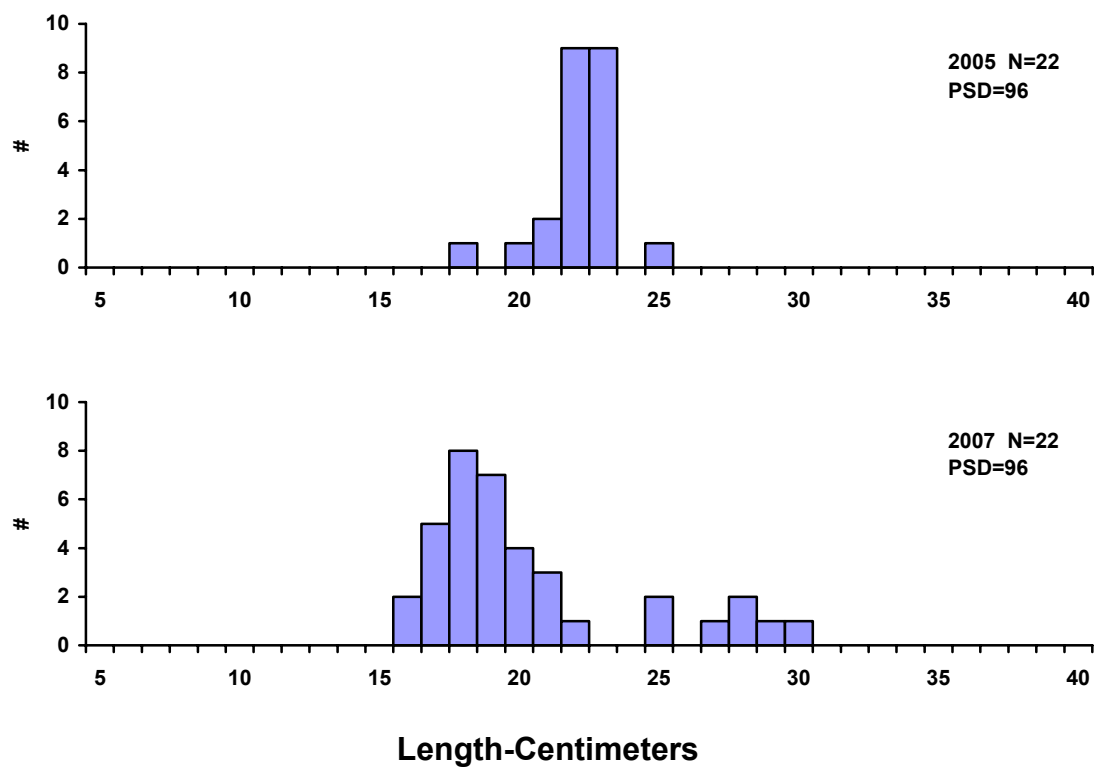


Figure 1. Length frequency histograms for black crappie sampled with trap nets in Beaver Lake, Yankton County, 2005 and 2007

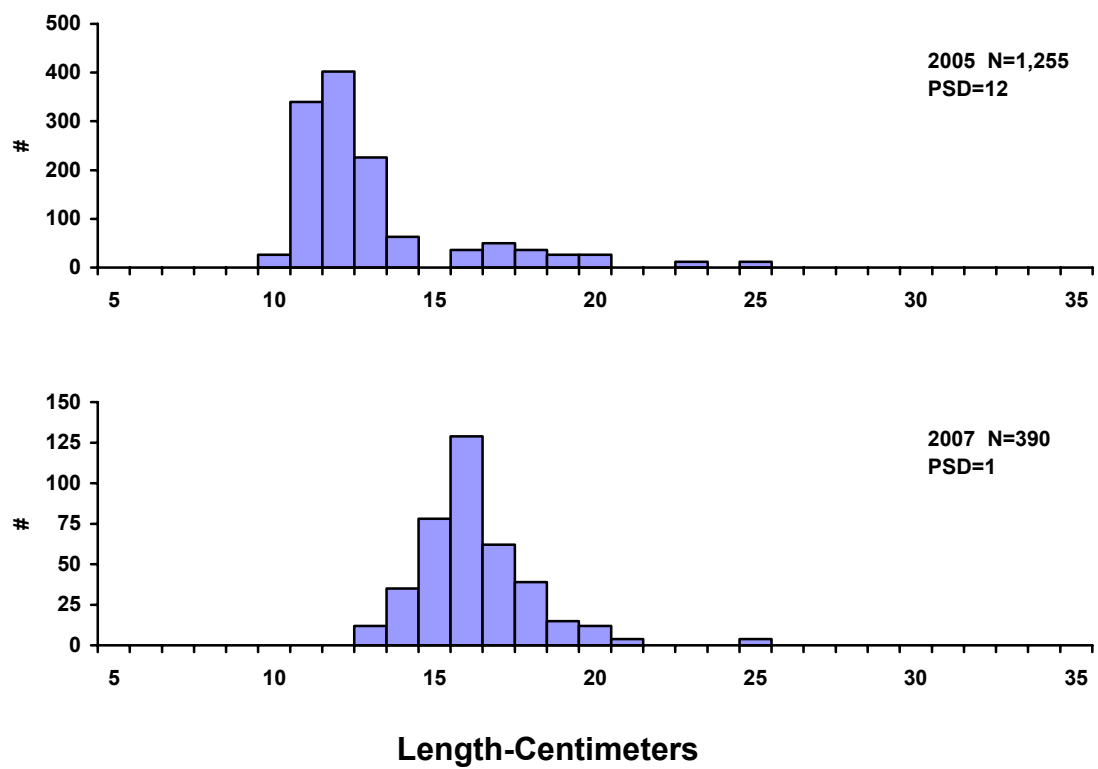


Figure 2. Length frequency histograms for black bullheads sampled with trap nets in Beaver Lake, Yankton County, 2005 and 2007.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.